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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/738,467	12/15/2000	Joseph Gerald Marcinkiewicz	K315.106.101	9674

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EXAMINER
PHAM, THOMAS K

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 03/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/738,467	MARCINKIEWICZ, JOSEPH GERALD	
	Examiner	Art Unit	
	Thomas K Pham	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2 & 4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Notice to Applicant(s)

1. Claims 1-24 of U.S. Application 09/738467 filed on 12/15/2000 are presented for examination.

DETAILED ACTION

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because it is not within the range of 50 to 150 words. Correction is required. See MPEP § 608.01(b).

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file. However, examiner notices that the letter of Request for Priority was missing from the applicant's file. A new copy of the letter is required.

Claim Objections

5. Claim 1 objected to because of the following informalities: spelling error on the word "comprizing" (line 3). Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicant Admitted Prior Art (AAPA).

8. As for claim 1, AAPA shows a brushless electrical machine comprising: a rotor (page 1 line 19); a stator (page 1 line 20); at least one phase winding arranged to establish flux in a magnetic circuit in the machine (page 1 lines 20-21); producing a signal indicative of flux-causing voltage across the at least one phase winding (page 4 lines 8-11).

9. As for claim 2, AAPA shows a machine as claimed in claim 1 in which the means for producing the signal indicative of the flux-causing voltage is operably coupled with the or each phase winding (page 4 lines 8-11).

10. Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by Applicant Admitted Prior Art (AAPA). AAPA shows a method for controlling a brushless electrical machine having a rotor (page 1 line 19), a stator (page 1 line 20) and at least one phase winding (page 1 lines 20-21); producing a feedback signal including a part indicative of the flux-causing voltage across the or each phase winding (page 4 lines 8-11); producing an input signal representing the demanded output of the machine (fig. 2 element 42); and controlling energization of the at least one phase winding in response to the input signal and the feedback signal (page 3 lines 23-28).

11. Claim 24 is rejected under 35 U.S.C. 102(b) as being anticipated by Applicant Admitted Prior Art (AAPA). AAPA shows a brushless electrical machine comprising: a rotor (page 1 line 19); a stator (page 1 line 20); at least one phase winding arranged to establish flux in a magnetic circuit in the machine (page 1 lines 20-21); and a signal producer arranged in relation to the magnetic circuit for producing a signal indicative of flux-causing voltage across the at least one phase winding (page 4 lines 8-11).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Lovett et al. U.S. Patent No. 6,225,767 (hereinafter Lovett). AAPA does not specifically show a machine as claimed in claim 2 in which the means for producing includes a search coil arranged in relation to the magnetic circuit to produce the signal indicative of the flux-causing voltage. However, Lovett shows a system in which the means for producing includes a search coil arranged in relation to the magnetic circuit to produce the signal indicative of the flux-causing voltage (col. 6 lines 48-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the search coil of

Lovett with the brushless electrical machine of AAPA because it would provide for producing the flux-causing voltage accurately by using less expensive and lower voltage devices.

14. Claims 4-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Lovett et al. U.S. Patent No. 6,225,767 (hereinafter Lovett).

15. As for claim 4, AAPA shows a brushless electrical drive system comprising: a brushless electrical machine having a rotor (page 1 line 19), a stator (page 1 line 20) and at least one phase winding arranged to establish flux in a magnetic circuit in the machine (page 1 lines 20-21); means for determining flux-causing voltage across the or each phase winding and producing a feedback signal representing the flux-causing voltage (page 4 lines 8-11); AAPA does not specifically show a flux controller having an input signal representing the demanded output of the machine, which controller is responsive to the input signal and the feedback signal to produce control signals for actuating switch means to control the flux in the at least one phase winding. However, Lovett shows a system comprising: a flux controller having an input signal representing the demanded output of the machine, which controller is responsive to the input signal and the feedback signal to produce control signals for actuating switch means to control the flux in the at least one phase winding (col. 5 line 65 to col. 6 line 10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the flux controller of Lovett with the brushless electrical machine of AAPA because it would provide for energizing the electro-magnetic system as it provides phase coil energization signals to the system.

16. As for claim 5, AAPA does not specifically show a system as claimed in claim 4 in which the means for determining the flux-causing voltage include transducer means operably coupled with the or each phase winding. However, Lovett shows a system in which the means for determining the flux-causing voltage include a position/velocity observer (transducer) of Lovett means operably coupled with the or each phase winding (col. 22 lines 16-19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the transducer of Lovett with the brushless electrical machine of AAPA because it would provide for supplying feedback information to the flux controller the current rotor position so that the movement of the rotor is controlled in a desired manner.

17. As for claim 6, AAPA does not specifically show a system as claimed in claim 5 in which the transducer means includes a search coil. However, Lovett shows a system in which the transducer means includes a search coil (col. 12 lines 28-30). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the search coil of Lovett with the brushless electrical machine of AAPA because it would provide for producing the flux-causing voltage accurately by using less expensive and lower voltage devices.

18. As for claim 7, AAPA shows a system as claimed in claim 4 in which the means for determining the flux-causing voltage is part of a flux estimator including means for deriving a flux signal proportional to the flux in the or each phase winding from the feedback signal (page 3 lines 14-21).

19. As for claim 8, AAPA does not specifically show a system as claimed in claim 7 in which the means for determining the flux-causing voltage includes a voltage model of the machine for producing the feedback signal. However, Lovett shows a system in which the means for

determining the flux-causing voltage includes a voltage model of the machine for producing the feedback signal (col. 12 lines 31-43). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the voltage model of Lovett with the brushless electrical machine of AAPA because it would provide for resulting in better performance to the machine.

20. As for claim 9, AAPA does not specifically show a system as claimed in claim 8 in which the voltage model includes a thermal model of the or each phase winding. However, Lovett shows a system in which the voltage model includes a thermal model of the or each phase winding (col. 12 lines 43-47). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the thermal model of Lovett with the brushless electrical machine of AAPA because it would provide for improving the current compensation value of the brushless electrical machine

21. As for claim 10, AAPA does not specifically show a system as claimed in claim 7 in which the means for deriving the flux signal includes an integrator arranged to integrate the feedback signal to produce the flux signal. However, Lovett shows a system in which the means for deriving the flux signal includes an integrator arranged to integrate the feedback signal to produce the flux signal (col. 11 lines 35-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the integrator of Lovett with the brushless electrical machine of AAPA because it would provide for determining the approximate flux for each phase coil of the brushless electrical machine.

22. As for claim 11, AAPA does not specifically show a system as claimed in claim 9, in which the estimator includes means for resetting the integrator at a point of substantially zero

phase current in the cycle of the or each phase of the machine. However, Lovett shows a system in which the estimator includes means for resetting the integrator at a point of substantially zero phase current in the cycle of the or each phase of the machine (col. 11 lines 24-34). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the estimator of Lovett with the brushless electrical machine of AAPA because it would provide for determining the approximate flux for each phase coil of the brushless electrical machine.

23. As for claim 12, AAPA does not specifically show a system as claimed in claim 7 in which the means for deriving the flux signal includes a low-pass filter arranged to filter the feedback signal to produce the flux signal. However, Lovett shows a system in which the means for deriving the flux signal includes a low-pass filter arranged to filter the feedback signal to produce the flux signal (col. 13 lines 8-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the low-pass filter of Lovett with the brushless electrical machine of AAPA because it would provide for determining the approximate flux for each phase coil of the brushless electrical machine.

24. As for claim 13, AAPA does not specifically show a system as claimed in claim 7 in which the estimator includes a current model of the machine arranged to receive signals representing phase current and rotor position and being operable to produce a flux estimate for the or each phase winding therefrom. However, Lovett shows a system in which the estimator includes a current model of the machine arranged to receive signals representing phase current and rotor position and being operable to produce a flux estimate for the or each phase winding therefrom (col. 12 lines 31-40). It would have been obvious to one of ordinary skill in the art at

the time the invention was made to combine the current model of Lovett with the brushless electrical machine of AAPA because it would provide for resulting in better performance to the machine.

25. As for claim 14, AAPA does not specifically show a system as claimed in claim 13 in which the current model includes an algebraic estimate of the flux in the or each phase winding based on inputs of phase current and rotor position. However, Lovett shows a system in which the current model includes an algebraic estimate of the flux in the or each phase winding based on inputs of phase current and rotor position (col. 12 lines 48-62). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the current model of Lovett with the brushless electrical machine of AAPA because it would provide for resulting in better performance to the machine.

26. As for claim 15, AAPA does not specifically show a system as claimed in claim 13 in which the estimator includes comparator means for producing a current model error signal from the flux estimate and the feedback signal. However, Lovett shows a system in which the estimator includes comparator means for producing a current model error signal from the flux estimate and the feedback signal (col. 9 lines 19-39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the estimator of Lovett with the brushless electrical machine of AAPA because it would provide for determining the approximate flux for each phase coil of the brushless electrical machine.

27. As for claim 16, AAPA does not specifically show a system as claimed in claim 13 in which the current model is an inverse current model, including an algebraic estimate of the current in the or each phase winding based on inputs of rotor position and estimated phase flux.

However, Lovett shows a system in which the current model is an inverse current model (col. 9 lines 31-39), including an algebraic estimate of the current in the or each phase winding based on inputs of rotor position and estimated phase flux (col. 12 lines 48-62). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the current model of Lovett with the brushless electrical machine of AAPA because it would provide for resulting in better performance to the machine.

28. As for claim 17, AAPA does not specifically show a system as claimed in claim 16 in which the estimator includes comparator means for producing an inverse current model error signal from the current estimate and monitored current in the or each phase winding. However, Lovett shows a system as claimed in claim 16 in which the estimator includes comparator means for producing an inverse current model error signal from the current estimate and monitored current in the or each phase winding (col. 9 lines 31-39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the estimator of Lovett with the brushless electrical machine of AAPA because it would provide for determining the approximate flux for each phase coil of the brushless electrical machine.

29. As for claim 18, AAPA does not specifically show a system as claimed in claim 13 in which the means for determining the flux-causing voltage includes a voltage model of the machine for producing the feedback signal, further in which the estimator further includes means for summing output of the voltage model and differentiated output of the current model to produce the feedback signal. However, Lovett shows a system in which the means for determining the flux-causing voltage includes a voltage model of the machine for producing the feedback signal (col. 12 lines 31-43), further in which the estimator further includes means for

summing output of the voltage model and differentiated output of the current model to produce the feedback signal (col. 11 line 56 to col. 12 line 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the voltage model and estimator of Lovett with the brushless electrical machine of AAPA because it would provide for determining the approximate flux for each phase coil and at the same time improve performance to the machine.

30. As for claim 19, AAPA does not specifically show a system as claimed in claim 13 in which the estimator further includes a current model, controller arranged to apply a control law function to current model output. However, Lovett shows a system in which the estimator further includes a current model, controller arranged to apply a control law function to current model output (col. 25 lines 1-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the control law of Lovett with the brushless electrical machine of AAPA because it would provide for resulting in a better performance of the brushless electrical machine that is available from conventional control approaches.

31. As for claim 20, AAPA does not specifically show a system as claimed in claim 19 in which the current model controller has a response to machine speed such that a current model output signal is increasingly attenuated with increasing machine speed above a predetermined machine speed. However, Lovett shows a system in which the current model controller has a response to machine speed such that a current model output signal is increasingly attenuated with increasing machine speed above a predetermined machine speed (col. 21 lines 4-26). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the current model of Lovett with the brushless electrical machine of AAPA because it

would provide for responding to the machine speed in controlling the movement of the rotor in a desired manner.

32. As for claim 21, AAPA does not specifically show a system as claimed in claim 13 in which the means for determining the flux-causing voltage includes a voltage model of the machine for producing the feedback signal, the system further including means for causing output of the current model to dominate output of the voltage model at relatively low machine speeds, and for causing output of the voltage model to dominate output of the current model at relatively high machine speeds. However, Lovett shows a system in which the means for determining the flux-causing voltage includes a voltage model of the machine for producing the feedback signal (col. 12 lines 31-43), the system further including means for causing output of the current model to dominate output of the voltage model at relatively low machine speeds, and for causing output of the voltage model to dominate output of the current model at relatively high machine speeds (col. 21 lines 4-26). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the models of Lovett with the brushless electrical machine of AAPA because it would provide for responding to the machine speed in controlling the movement of the rotor in a desired manner and resulting in better performance to the machine.

33. As for claim 22, AAPA does not specifically show a system as claimed in claim 4 in which the input signal represents a flux demand, the flux controller further including a comparator for comparing determined flux with demanded flux to produce the control signals. However, Lovett shows a system in which the input signal represents a flux demand, the flux controller further including a comparator for comparing determined flux with demanded flux to

produce the control signals (col. 8 lines 33-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the flux controller with comparator of Lovett with the brushless electrical machine of AAPA because it would provide for comparing the flux feedback signal from the input flux signal in order to produce an error signal that varies between the actual flux and the desire flux of the brushless electrical machine.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Thomas Pham; whose telephone number is (703) 305-7587 and fax number is (703) 746-8874. The examiner can normally be reached on Monday-Friday from 7:30AM- 4:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *John Follansbee*, can be reached on *(703) 305-8498 or via e-mail addressed to [joh.follansbee@uspto.gov]*. The fax number for this Group is (703) 308-5403.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [**thomas.pham@uspto.gov**].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Thomas K. Pham
Patent Examiner

tp
March 18, 2003

Ramesh Patel 3/19/03
RAMESH PATEL
PRIMARY EXAMINER
For John Follansbee